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10/578,495	01/09/2007	Hiroki Matsuyama	925-341	1716
23117 7590 05/12/2009 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
WATTS, ALAN B				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/578,495

Applicant(s)

MATSUYAMA ET AL.

Examiner

ALAN B. WAITS

Art Unit

3656

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2009.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 05 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 4, 9, 16 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2, 4 and 16 recite the limitation "a gap". It is unclear if this is the same limitation as previously recited in the claim or if this is a new gap.

Claims 9 and 17 recite an equation. The specification at [0109] discloses a different equation than the equation in the claims. It is unclear which equation is the correct equation.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by EP 0683329. EP '329 discloses a similar device comprising:

Re clm 1:

- An inner ring (11, fig 2)
- An outer ring (12, fig 2)

- A plurality of rolling elements (13, fig 2) placed between the inner ring and the outer ring
- An oil inflow suppression member (15, fig 2) that partially blocks an oil inflow path on an inflow side of the device and that suppresses oil inflow between the inner ring and the outer ring
- A gap (j, fig 2) is always maintained between the oil inflow suppression member and at least one of the inner ring and the outer ring

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-8, 10, 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nunotani et al USP 4919551 in view of Sorensen USP 1354922.

Nunotani discloses a similar device comprising:

Re clm 1:

- An inner ring (11, fig 1)
- An outer ring (12, fig 1)
- A plurality of rolling elements (13, fig 1) placed between the inner ring and the outer ring

- An oil inflow suppression member (24, 15, and 18, fig 1) that partially blocks an oil inflow path on an inflow side of the device and that suppresses oil inflow between the inner ring and the outer ring

Nunotani does not disclose:

- A gap is always maintained between the oil inflow suppression member and at least one of the inner ring and the outer ring

Sorensen teaches a shield member (7 and 12) comprising:

- A gap (between 12 and 2) is always maintained between the shield and at least one of the inner ring and the outer ring.

Since both Nunotani and Sorensen teach a shield member (12 and 7 of Sorensen; 18 and 19; Nunotani), it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute Nunotani's shield members with the shield member of Sorensen and provide:

- A gap is always maintained between the oil inflow suppression member and at least one of the inner ring and the outer ring

to achieve the predictable result of shielding the rolling element of the bearing.

Re clm 2. Nunotani in view of Sorensen further discloses:

- Rolling elements are tapered rollers (fig 1; Nunotani)
- The inner ring is a rotating ring that has a tapered raceway surface (20, fig 1; Nunotani)
- The outer ring is a fixed ring that has a tapered raceway surface (21, fig 1; Nunotani)

- The inner ring has a flange portion (the bump on 11 to the left side of the roller 13, fig 1; Nunotani) brought in contact with minor diameter end surface of the tapered rollers
- The oil inflow suppression member is a shield plate (12 and 7; Sorensen) on the inner ring having a protrusion that protrudes radially outwardly of the inner ring such that a gap is maintained between an end of the shield plate and the outer ring
- A retainer (17, fig 1; Nunotani) that retains the tapered rollers
- The protrusion of the shield plate is spaced from the retainer in an axial direction of the inner ring (fig 1; Nunotani)

Re clm 3, Nunotani does not disclose:

- The protrusion has an outside diameter that is not greater than an inside diameter of an end portion on a minor diameter side of the tapered raceway surface of the outer ring

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide:

- The protrusion has an outside diameter that is not greater than an inside diameter of an end portion on a minor diameter side of the tapered raceway surface of the outer ring

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re clm 4 and 16, Nunotani does not disclose:

- A gap in the axial direction between the protrusion and the retainer is not greater than 3 mm

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide:

- A gap in the axial direction between the protrusion and the retainer is not greater than 3 mm

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Re clm 5:

- The shield plate is an integral part of the inner ring (as shown in Fig 1; Nunontani and by Sorensen)

Re clm 6:

- Rolling elements are tapered rollers (fig 1; Nunotani)
- The inner ring is a rotating ring that has a tapered raceway surface (20, fig 1; Nunotani)
- The outer ring is a fixed ring that has a tapered raceway surface (21, fig 1; Nunotani)
- The oil inflow suppression member is a shield plate (12 and 7; Sorensen) having a protrusion
- A retainer (17, fig 1; Nunotani) that retains the tapered rollers

- The protrusion of the shield plate is spaced from the retainer in an axial direction of the outer ring (fig 1; Nunotani)

Nunotani does not disclose:

- Said shield plate on the outer ring having a protrusion that protrudes radially inwardly of an end portion on a minor diameter side of the tapered raceway surface of the outer ring

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide:

- Said shield plate on the outer ring having a protrusion that protrudes radially inwardly of an end portion on a minor diameter side of the tapered raceway surface of the outer ring

since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

Re clm 7:

- The shield plate is an integral part of the outer ring (fig 1)

Re clm 8:

- An oil outflow promotion structure (19, fig 1; Nunotani)

Re clm 10:

- The rolling elements are tapered rollers (fig 1)
- The oil outflow promotion structure comprises the tapered raceway surface of the outer ring set in contact with the tapered rollers at a contact angle of not smaller than 25 degrees (fig 1)

Re clm 11:

- The oil outflow promotion structure comprises a member (19, fig 1) that extends along an oil outflow direction on an oil outflow side

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nunotani et al USP 4919551 in view of Sorensen USP 1354922 as applied to claim 8 above, and further in view of Straub et al USP 6461049.

Nunotani in view of Sorensen teaches all the claimed subject matter as described above.

Nunotani in view of Sorensen does not explicitly disclose:

- A number of tapered rollers is z (13, fig 1; Nunotani)
- A mean diameter of the tapered rollers is DW
- A pitch circle diameter of the tapered rollers is dm
- The device satisfies the following expression

$$\circ z \leq 0.85/(DW*(\pi*dm))$$

Straub teaches:

- A number of tapered rollers is z (13, fig 1; Nunotani)
- A mean diameter of the tapered rollers is DW
- A pitch circle diameter of the tapered rollers is dm
- The device satisfies the following expression

$$\circ z \leq 0.85/(DW*(\pi*dm)) \text{ (fig 19)}$$

for the purpose of creating additional space for the lubricant so that lubrication of the bearing is possible for its entire life, lubricant flow is increased so that a better cooling is realized, and improved flushing of dust particles is realized (col 1, lines 50-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Nunotani in view of Sorensen and provide:

- A number of tapered rollers is z (13, fig 1; Nunotani)
- A mean diameter of the tapered rollers is DW
- A pitch circle diameter of the tapered rollers is dm
- The device satisfies the following expression

$$\circ \quad z \leq 0.85/(DW * (\pi * dm))$$

for the purpose of creating additional space for the lubricant so that lubrication of the bearing is possible for its entire life, lubricant flow is increased so that a better cooling is realized, and improved flushing of dust particles is realized.

8. Claims 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nunotani et al USP 4919551 in view of Straub et al USP 6461049.

Nunotani discloses a similar device comprising:

- An inner ring (11, fig 1)
- An outer ring (12, fig 1)

Nunotani does not explicitly disclose:

- A number of tapered rollers is z (13, fig 1; Nunotani)
- A mean diameter of the tapered rollers is DW
- A pitch circle diameter of the tapered rollers is dm

- The device satisfies the following expression
 - $z \leq 0.85/(DW*(\pi*dm))$

Straub teaches:

- A number of tapered rollers is z (13, fig 1; Nunotani)
- A mean diameter of the tapered rollers is DW
- A pitch circle diameter of the tapered rollers is dm
- The device satisfies the following expression
 - $z \leq 0.85/(DW*(\pi*dm))$ (fig 19)

for the purpose of creating additional space for the lubricant so that lubrication of the bearing is possible for its entire life, lubricant flow is increased so that a better cooling is realized, and improved flushing of dust particles is realized (col 1, lines 50-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Nunotani and provide:

- A number of tapered rollers is z (13, fig 1; Nunotani)
- A mean diameter of the tapered rollers is DW
- A pitch circle diameter of the tapered rollers is dm
- The device satisfies the following expression
 - $z \leq 0.85/(DW*(\pi*dm))$

for the purpose of creating additional space for the lubricant so that lubrication of the bearing is possible for its entire life, lubricant flow is increased so that a better cooling is realized, and improved flushing of dust particles is realized.

Re clm 18, Nunotani further discloses:

- a shield plate (18, fig 1) that is integrally formed on an oil inflow side of the inner ring
- the shield plate extends outward in a radial direction from the inner ring to partially block an oil inflow path formed between the inner and outer rings (fig 1)
- a gap (distance between end of plate 18 and inner diameter of 12, fig 1) is always maintained between an end of the shield plate and the outer ring

Re clm 19, Nunotani further discloses:

- a retainer (17, fig 1) that keeps the tapered rolling elements evenly spaced around a circumference of the inner and outer rings
- an end of the retainer on the oil inflow side extends inward in a radial direction (fig 1)
- an outer diameter of the shield plate is larger than an inner diameter of the end of the retainer on the oil inflow side (fig 1)

Re clm 20:

- a shield plate (18, fig 1) that is integrally formed on an oil inflow side
- the shield plate extends in a radial direction to partially block an oil inflow path formed between the inner and outer rings (fig 1)
- a gap (distance between end of plate 18 and inner diameter of 12, fig 1) is always maintained

Nunotani does not disclose:

- a shield plate (18, fig 1) that is integrally formed on an oil inflow side of the outer ring
- the shield plate extends inward from the outer ring in a radial direction to partially block an oil inflow path formed between the inner and outer rings (fig 1)
- a gap (distance between end of plate 18 and inner diameter of 12, fig 1) is always maintained between an end of the shield plate and the inner ring

Nunotani does not disclose:

- a shield plate that is integrally formed on an oil inflow side of the outer ring
- the shield plate extends inward from the outer ring in a radial direction to partially block an oil inflow path formed between the inner and outer rings
- a gap is always maintained between an end of the shield plate and the inner ring

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide:

- a shield plate that is integrally formed on an oil inflow side of the outer ring
- the shield plate extends inward from the outer ring in a radial direction to partially block an oil inflow path formed between the inner and outer rings
- a gap is always maintained between an end of the shield plate and the inner ring

since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein*, 8 USPQ 167.

Re clm 21:

- a retainer (17, fig 1) that keeps the tapered rolling elements evenly spaced around a circumference of the inner and outer rings
- an end of the retainer on the oil inflow side extends inward in a radial direction (fig 1)
- an outer diameter of the shield plate is smaller than an inner diameter of the end of the retainer on the oil inflow side (fig 1)

9. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nunotani et al USP 4919551 in view of Sorensen USP 1354922 as applied to claim 10 and Nunotani et al USP 4919551 in view of Sorensen USP 1354922 and in further view of Straub et al USP 6461049 as applied to claim 9 above, respectively, and further in view of Hiromasa JP9177796

Nunotani discloses all the claimed subject matter as described above.

Nunotani does not disclose:

- At least on of an end surface on the major diameter side of the tapered rollers and an end surface of a flange portion that is provided on a major diameter side of a tapered raceway surface of the inner ring and brought in contact with the end surface on the major diameter side of the tapered rollers is coated with a hard coating

Hiromasa discloses:

- At least on of an end surface on the major diameter side of the tapered rollers and an end surface of a flange portion (3a) that is provided on a

major diameter side of a tapered raceway surface of the inner ring and brought in contact with the end surface on the major diameter side of the tapered rollers is coated with a hard coating (abs) for the purpose of reducing the roughness of an end face of a roller and the roller bearing achieves the 'breaking-in' from the beginning of the operation to prevent the vibration due to the sticking between the end face of the roller and the inner sides (abs).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of EP '329 in view of Nunotani and provide:

- At least on of an end surface on the major diameter side of the tapered rollers and an end surface of a flange portion that is provided on a major diameter side of a tapered raceway surface of the inner ring and brought in contact with the end surface on the major diameter side of the tapered rollers is coated with a hard coating

for the purpose of reducing the roughness of an end face of a roller and the roller bearing achieves the 'breaking-in' from the beginning of the operation to prevent the vibration due to the sticking between the end face of the roller and the inner sides.

10. Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0683329 as applied to claim 1 above, and in view of Nunotani et al USP 4919551.

EP '329 discloses all the claimed subject matter as described above.

Re clm 8, although EP '329 discloses the partial seal member on either the inflow or the outflow side (col 4, lines 21-30), EP '329 does not disclose:

- An oil outflow promotion structure for promoting outflow of oil that enters between the inner ring and the outer ring

Nunotani teaches:

- An oil outflow promotion structure (19, fig 1) for promoting outflow of oil that enters between the inner ring and the outer ring

for the purpose of temporarily retaining lubrication inside the bearing when there is not pressure difference between the two sides of the bearing (col 5, lines 10-15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of EP '329 and provide:

- An oil outflow promotion structure for promoting outflow of oil that enters between the inner ring and the outer ring

for the purpose of temporarily retaining lubrication inside the bearing when there is not pressure difference between the two sides of the bearing.

Re clm 14, EP '329 further discloses:

- The rolling elements are balls (fig 3)
- The oil outflow promotion structure includes a portion of an inner surface of the outer ring that as a shape that widens toward an oil outflow side (15, fig 3)

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0683329 in view of Nunotani et al USP 4919551 as applied to claim 14 above, and further in view of Hiromasa JP9177796.

EP '329 in view of Nunotani discloses all the claimed subject matter as described above.

EP '329 in view of Nunotani does not disclose:

- At least one of raceway surfaces on the inner ring and the outer ring and the balls is coated with a hard coating

Hiromasa discloses:

- At least one of raceway surfaces on the inner ring and the outer ring and the balls is coated with a hard coating (abs)

for the purpose of reducing the roughness of an end face of a roller and the roller bearing achieves the 'breaking-in' from the beginning of the operation to prevent the vibration due to the sticking between the end face of the roller and the inner sides (abs).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of EP '329 in view of Nunotani and provide:

- At least one of raceway surfaces on the inner ring and the outer ring and the balls is coated with a hard coating

for the purpose of reducing the roughness of an end face of a roller and the roller bearing achieves the 'breaking-in' from the beginning of the operation to prevent the vibration due to the sticking between the end face of the roller and the inner sides.

Response to Arguments

12. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN B. WAITS whose telephone number is (571)270-3664. The examiner can normally be reached on Monday through Friday 7:30 am to 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan B Waits/
Examiner, Art Unit 3656

/William C. Joyce/
Primary Examiner, Art Unit 3656